4.2.1.4 Water Resources

Construction and operation of the potential long-term storage facilities at Hanford would affect water resources. All facility options (in either the 400 or 200 Areas) are above the 100-year, 500-year, probable maximum flood (40,000 m^3/s [1.4 million ft^3/s]), flooding from dam failures, and flooding from a landslide resulting in river blockage. At Hanford, surface water resources, primarily the Columbia River, would be used to meet all construction and operation water requirements for facilities located in the vicinity of the 200 Area. The Columbia River has sufficient flow to support any of the alternatives. No construction- or operation-related impacts would exceed 1.1 percent of the Columbia River's average flow. Groundwater would be used to meet water requirements for facilities located in the 400 Area. During construction and operation of the facilities, treated wastewater would continue to be discharged in compliance with NPDES permit requirements, to infiltration ponds in the 200 Area, or nearby streams, or would be recycled at newly constructed wastewater treatment facilities. Stormwater runoff would be collected and treated, if necessary, before discharge to natural drainage channels in accordance with permit requirements. [Text deleted.]

Minimal impacts to groundwater are anticipated because no direct discharges would occur during construction and operation. Table 4.2.1.4–1 presents No Action water resources uses and discharges and the potential changes to water resources at Hanford resulting from the long-term storage alternatives.

Preferred Alternative: No Action Alternative

Surface Water. [Text deleted.] A description of the activities that would continue at Hanford is provided in Section 3.2. Under this alternative, surface water withdrawals from the Columbia River are not expected to increase from the current usage of 13,511 million l/yr (3,569 million gal/yr) by 2005. Treated wastewater discharged to infiltration/evaporation ponds is expected to remain at 246 million l/yr (65 million gal/yr). Under this alternative, current restoration programs would continue, and water quality is anticipated to improve.

Groundwater. Under this alternative, no additional impacts to groundwater resources are anticipated. Withdrawals from current operations in the 400 Area (195 million l/yr [51.6 million gal/yr]) are not anticipated to increase by 2005.

Upgrade Alternative

Upgrade Without Rocky Flats Environmental Technology Site Plutonium or Los Alamos National Laboratory Plutonium Subalternative

Modify Existing Fuels and Materials Examination Facility for Plutonium Storage

Surface Water. There are no unique construction characteristics associated with water requirements and discharges from the modify FMEF option. Since the facilities are located in the 400 Area, no surface water would be withdrawn for any modification or operation activities. Groundwater from the unconfined aquifer would be used to meet water requirements. Since upgrades will take place in an existing facility, no impact to surface water would result from soil erosion of disturbed land and siltation of surface drainage channels during modifications. During operation, stormwater runoff would be collected and treated, if necessary, before discharge to natural drainage channels.

During modification of selected areas of the FMEF, sanitary wastewater (approximately 3.9 million l/yr [1.0 million gal/yr]) would be generated and discharged to the existing wastewater treatment systems at the 400 Area. This would cause a 1.6-percent increase in the effluent discharged at Hanford. During operation, wastewater would be discharged to infiltration/evaporation ponds. [Text deleted.]

Fire sprinkler water and truck hose-down water would be collected in tanks, monitored for radioactivity, and if uncontaminated, discharged to storm drains that discharge to local drainage channels. If contaminated, this water would be treated as required.

The FMEF is located in the 400 Area above the floodplain from the probable maximum flood of 40,000 m^3/s (1.4 million ft^3/s), which is greater than the 500-year flood. The possibility of flooding from dam failures with a flood wave of 600,000 m^3/s (21 million ft^3/s) has been studied by the COE. In addition to the areas inundated by the probable maximum flood, the remainder of the 100 Area, the 300 Area, and nearly all of Richland, but not the 400 Area, would be flooded. A landslide resulting in river blockage downstream of the 400 Area, and flooding along the Columbia River during a river flood flow of 17,000 m^3/s (600,000 ft^3/s), would not inundate the FMEF. Additionally, it is unlikely that the landslide would be downstream.

Groundwater. During modification activities, the quantity of water required would be approximately 5.0 million l/yr (1.3 million gal/yr), which would represent a 2.6-percent increase over the projected No Action groundwater withdrawal (195 million l/yr [52 million gal/yr]). During operation, groundwater would be obtained from existing supply systems in the 400 Area. The total annual requirement for the modified FMEF would be 8.4 million l/yr (2.2 million gal/yr), which would represent a 4.3-percent increase over the projected groundwater withdrawal (195 million l/yr [52 million gal/yr]). It is not expected that these small increases would impact regional groundwater levels.

No wastewater would be discharged directly to groundwater, so groundwater quality would not be affected. However, some of the treated wastewater discharged to evaporation/percolation ponds would percolate downward into the groundwater. The water discharged to and from the ponds would be monitored and would not be discharged until contaminant levels were within the limits specified. Impacts to groundwater quality are therefore not expected. In addition, other factors contributing to a lessening of potential impacts to groundwater are the combined effects of a deep water table, low discharge volumes, and high evaporation rates.

Similarly, some stormwater runoff and other discharges routed to storm drains could percolate into the subsurface. Storm sewer and storm drain discharges would be monitored under the NPDES stormwater regulations. No impacts to groundwater quality are expected.

Construct New 200 West Area Facility for Plutonium Storage

Surface Water. Because the new Hanford Pu storage facility would be located in the 200 West Area, surface water would be used to meet water requirements. During construction, approximately 5 million l/yr (1.3 million gal/yr) of water would be required. This represents a much less than 1-percent increase in the projected No Action surface water withdrawal. This additional withdrawal would not cause any impacts. During operation, approximately 8.4 million l/yr (2.2 million gal/yr) of water would be required. This represents a much less than 1-percent increase in the projected annual surface water withdrawal, and it would increase Hanford's total withdrawal from the Columbia River to less than $1.0x10^{-6}$ of the river's average minimum flow. This would not cause any impacts to surface water availability.

During construction of the new Hanford Pu storage facility, sanitary wastewater (approximately 3.9 million l/yr [1.0 million gal/yr]) would be generated and discharged to the existing wastewater treatment systems at the 200 West Area. This would cause a 1.6-percent increase in the effluent discharged at Hanford. During operation, treated wastewater would be discharged to evaporation/infiltration ponds. [Text deleted.] All discharges would be monitored to comply with discharge requirements. Makeup water for the closed-cycle cooling system would be recycled.

The new facility would be located in the 200 Area, which is above the 100-year, 500-year, probable maximum floods, flooding from dam failures, and flooding from a landslide resulting from river blockage.

Groundwater. Because surface water would be used during construction and operation, no impact on groundwater availability is anticipated. No wastewater would be discharged from the ponds directly to groundwater, so groundwater quality would not be affected. However, some of the treated wastewater discharged to evaporation/percolation ponds could percolate downward into the groundwater. The water would be monitored and would not be discharged until contaminant levels were within the limits specified in the NPDES permit. Impacts to groundwater quality are therefore not expected. In addition, other factors contributing to a lessening of potential impacts to groundwater are the combined effects of a deep water table, low discharge volumes, and high evaporation rates. Similarly, some stormwater runoff routed to storm drains could percolate into the subsurface. These discharges would be monitored under the NPDES stormwater regulations. No impacts to groundwater quality are expected.

Upgrade With All or Some Rocky Flats Environmental Technology Site Plutonium and Los Alamos National Laboratory Plutonium Subalternative

Modify Existing Fuels and Materials Examination Facility for Plutonium Storage

Modification activities would require 7.8 million l/yr (2.1 million gal/yr) of water, a 4.0-percent increase over the projected No Action water use. This is approximately 2.8 million l/yr (0.74 million gal/yr) of water more than that required for the Pu storage upgrade without RFETS Pu or LANL Pu material water requirements. During operations, 8.9 million l/yr (2.4 million gal/yr) of water would be required, a 4.6-percent increase over projected No Action water use. All other water requirements of the Pu storage upgrade with RFETS Pu and LANL Pu material are identical to the modified FMEF without RFETS Pu or LANL material.

Modifying FMEF to store RFETS Pu and LANL Pu material would increase water discharges by 5.9 million l/yr (1.6 million gal/yr) or 1.9 percent during construction activities over the projected No Action discharge. During operations, wastewater would be discharged to infiltration/evaporation ponds. All other wastewater requirements of the upgrade with RFETS Pu and LANL Pu material are similar to the modified FMEF without RFETS Pu or LANL Pu material.

Construct New 200 West Area Facility for Plutonium Storage

During construction, the facility would require 7.8 million l/yr (2.1 million gal/yr), a much less than 1-percent increase over projected No Action water use. All other water requirements of the new Pu storage upgrade with RFETS Pu and LANL Pu material are identical to the new Hanford Pu facility without RFETS Pu or LANL Pu material. During operations, 8.9 million l/yr (2.4 million gal/yr) of water would be required. This represents a less than 1-percent increase in surface water withdrawal.

Water resources impacts during construction and operation with RFETS Pu and LANL Pu material would increase water discharges by 5.9 million l/yr (1.6 million gal/yr) or 1.9 percent of the projected No Action discharge. During operations, wastewater would be discharged to infiltration/evaporation ponds. All other wastewater discharges of the upgrade with RFETS Pu and LANL Pu material are the same as previously discussed for the new Hanford Pu storage facility without RFETS Pu or LANL Pu material.

Consolidation Alternative

Construct New Plutonium Storage Facility

The new consolidated Pu storage facility would be located west of the 200 East Area of Hanford. Impacts associated with it are the same as those discussed above for the upgrade of the existing Pu storage area, with the following exceptions. The water requirements for construction and operation of this option are approximately 85 million l/yr (22.5 million gal/yr) and 110 million l/yr (29 million gal/yr), respectively. These additional requirements represent 0.6- and 0.8-percent increases, respectively, in the projected annual surface water withdrawals from the Columbia River and should not cause any impacts.

The quantity of sanitary wastewater generated during construction of this option would be approximately 7.7 million l/yr (2 million gal/yr). This represents a 3.1-percent increase in the projected annual wastewater effluent that would be discharged to evaporation/infiltration ponds. During operations, sanitary, utility, and process wastewaters would be recycled. No impacts to groundwater are expected from discharges. Groundwater would not be used for this alternative, so no impacts to groundwater availability or quality would be expected.

Collocation Alternative

Construct New Plutonium and Highly Enriched Uranium Storage Facilities

These storage facilities would be located west of the 200 East Area of Hanford, and the impacts associated with them are the same as those discussed above, with the following exceptions. The water requirements for construction and operation of this option are greater, approximately 105 million l/yr (27.7 million gal/yr) and 150 million l/yr (39.6 million gal/yr), respectively. These additional requirements represent 0.8- and 1.1-percent increases, respectively, in the projected annual surface water withdrawals from the Columbia River and should not cause any impacts.

The quantity of sanitary wastewater generated during construction of this option would be approximately 12.5 million l/yr (3.3 million gal/yr). This represents a 5.1-percent increase in the projected annual wastewater effluent that would be discharged to evaporation/infiltration ponds. During operations, sanitary, utility, and process wastewater would be recycled at newly constructed wastewater treatment systems. No impacts are expected. Groundwater would not be used for this alternative. Therefore, no impacts to groundwater availability or quality would be expected.

Subalternative Not Including Strategic Reserve and Weapons Research and Development Materials

Water resource impacts for construction and operation of this subalternative are expected to be slightly less than those for the Upgrade With All or Some RFETS Pu and LANL Pu, the Pu Consolidated, and the Pu and HEU Collocation Storage Alternatives at Hanford described previously because of the reduction in the amount of material. [Text deleted.]

Phaseout

Should the current Pu storage mission at Hanford be phased out, surface water withdrawals from the Columbia River and nonhazardous wastewater discharge to evaporation/percolation ponds would decrease by negligible quantities. No noticeable impacts would occur or be alleviated due to these decreases.

[Text deleted.]